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BANKING STRUCTURE AND FUNDS AVAILABILITY IN NONMETROPOLITAN AREAS

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BANKING STRUCTURE AND FUNDS AVAILABILITY IN NONMETROPOLITAN AREAS

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STATEMENT BY AUTHOR

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The author alone, however, assumes full responsibility for the content, analysis and judgments contained in this study.

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ABSTRACT

Increases in interstate and intrastate banking may have an impact on the availability of credit in nonmetropolitan communities. Past research provides substantial groundwork for additional study. To determine if the allocation of credit to nonmetropolitan regions in a branch banking state (Arizona) differs from that in a unit banking state (Colorado), ordinary least squares regression analysis is utilized. Rapidly growing nonmetropolitan areas in Arizona experienced greater credit availability than that experienced by similar communities in Colorado. However, slow growing communities in Arizona had lower loan-to-deposit ratios than would have existed under Colorado unit banking. Therefore, commercial bank allocation of loanable funds within nonmetropolitan areas may be more efficient where geographic restrictions have been relaxed.

CHAPTER 1

INTRODUCTION

Recent changes in banking legislation in the United States ("Depository Institutions Deregulation and Monetary Control Act of 1980") have increasingly supported the liberalization of branching restrictions through expanded geographic boundaries. Deregulation has affected the structure of the banking industry, i.e., branching and bank concentration, and has encouraged the growth of both intrastate and interstate banking organizations. Currently, large banking concerns are positioning themselves for the advent of national interstate branching. Expectations are for most banks to become affiliated with a national electronic banking network sometime in the near future.

Previous studies have examined the structure-performance issue in the banking industry and while the issue has not been fully resolved, much of the evidence supports the relaxation of branching restrictions. Relaxed branching restrictions have been linked to an increase in convenience for consumers. In rural areas, this greater convenience takes the form of more bank

offices from which rural residents can choose. It also appears that branching increases competition, which may produce benefits for the population. Potential benefits from branching include an increase in the number of services and dollar volume of loans offered by rural banking offices. Branch bank offices often perform in a more aggressive manner than banks in unit-banking states and this leads to competitive pricing policies for loans and services at the local level, as well as prices that are more consistent with those charged in larger urban markets. One reason to oppose the liberalization of branching laws would be if branching was accompanied by a flow of funds from nonmetropolitan to metropolitan areas and therefore a decrease in the amount of credit available for local rural customers. This issue is the concern of many rural residents who fear that branching promotes the larger urban interests at the expense of rural borrowers. Rural communities believe they can not afford to suffer the loss of capital through branching networks that transfer rural funds to urban areas. These communities propose that increases in the amount of credit available are required if business, agricultural and industrial expansion are to continue in nonmetropolitan regions. Earlier research has indicated that in general, branch bank loan-to-deposit ratios are

greater than unit bank loan-to-deposit ratios. However, while loan-to-deposit ratios of branch banks exceed loan-to-deposit ratios of unit banks, it is not clear if local rural residents are the beneficiaries of the higher loan-to-deposit ratios in branch banking states.

The purpose of this study is to determine whether local communities in the non-Standard Metropolitan Statistical Areas (nonSMSA)[1] of Arizona (statewide branching state) and Colorado (unit banking state) are better served by unit or branch-office commercial banks. Service in this study will refer primarily to the loan behavior exhibited by bank offices relative to total deposits. This research is designed to be regional in nature and attempts to analyze those factors which influence the lending policies and actions of bank offices in Arizona and Colorado nonmetropolitan regions. It is intended to view rural communities as economic entities with problems and goals that need to be addressed. The lending behavior of Arizona and Colorado rural banks is observed through the years 1977-1980. This is a particularly interesting period because it encompasses a

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1. In this paper, non-Standard Metropolitan Statistical Areas (nonSMSA) refers to nonmetropolitan and rural areas. SMSA refers to urban and metropolitan regions.

portion of time before and postdating the advent of high interest rates. In addition, the data collected for Arizona banks is by branch office and thus differs from studies that traditionally used aggregated loan and deposit data for multi-office banks.

In the following chapters it shall be demonstrated that the lending behavior of nonmetropolitan branches differs from that of rural unit banks. This study indicates that bank structure has a significant influence on the availability of rural credit. High loan-to-deposit ratios are associated with rapidly growing communities and low loan-to-deposit ratios with slower growing towns. In addition to bank structure, demographics and economic conditions have had systematic influences on the conduct of banks toward rural customers. In unit-banking Colorado, bank concentration at the state level is low but in Arizona where branching is allowed, the three largest banks control a very high percentage of all deposits. Bank size is shown to affect the amount of credit allocated by a bank. The branch and unit banking systems in the two states perform equally well when measuring the availability of bank offices to the nonmetropolitan population. Changes in population and the percentage of elderly in a community have a significant influence on bank lending

in rural areas. The presence or lack of alternative credit sources in a community also acts as an influence on the loan-to-deposit ratio of a banking office.

The research supporting the above findings is organized as follows. First, Chapter 2 reviews previous studies and discusses the nature of the data used, the applicability of methodologies utilized and the conclusions drawn from the test results. Chapter 3 provides the sources from which study data were obtained and details the procedures that were followed in the analysis. This chapter includes the variables tested and presents the regression model that is used. Chapter 4 documents the results of the statistical analysis and identifies those variables and equations which "best" explain the loan-to-deposit ratios of rural commercial bank offices. In Chapter 5, the relationships between local credit availability and bank structure, demographic and economic conditions are summarized and policy implications are presented.

CHAPTER 2

REVIEW OF THE LITERATURE

Previous research has examined many aspects of the structure-performance issue in banking. Studies dealing with the competitive aspects of different banking structures are reviewed first. This includes an examination of the availability of commercial bank offices in communities and the relationship between the number of offices and competition. Next, research concerned with the impact of bank structure on bank services to local communities is examined. The third consideration is the amount of credit banks make available to local customers. Finally, studies examining the role of bank financial behavior in rural development are reviewed.

Bank Structure and Competition

Generally it is thought that competitive structures best serve the public. Benston (1973) delineates the conditions that must exist for competition to occur. These are unrestricted entry, the possibility of exit through merger or failure, an absence of

collusion and a lack of economies of scale that result in "natural" monopolies.

Most researchers agree that there is a need for intensive competition to insure efficient performance in the banking industry. How to achieve this objective is a matter of debate. Phillips (1964) believes there is a need to permit freer entry into the market. He advocates public policies that encourage more freedom of decision-making to individual banks and promote a pro-competitive spirit among institutions. He contends tacit understandings that discourage competition grow between banks and are sanctioned by public regulations. Phillips cites as evidence of the lack of competition in banking the low rate of bank failures, the ability of firms of less than optimal size to operate, and minimal price competition. Jacobs (1965) examined the competitive aspects of changes in bank structure and found that as states loosen branching restrictions, the number of banks declines but, the mean total asset size of banks and the number of bank offices increases. Jacobs' study covered all states except Alaska and Hawaii for the period 1946-1963. His research concluded that branching restriction changes should be made in the context of the entire regulatory framework and with emphasis on the long-run effects.

Cohen and Reid (1967) and Solomon (1970) examined which types of branching legislation enhance the well-being of the public and should be encouraged. Cohen and Reid note that mergers promote management interests rather than the interests of either stockholders or the public. The adoption of liberalized branching laws and an increase in de novo branching instead of mergers would provide a mixture of local banks and branches of large institutions in local communities. One-bank towns would particularly benefit if branching improves pricing performance in a market. Solomon (1970) also attacks the presumed benefits of bank mergers. She states that beyond some point, "the disadvantages of banking through merger, including the loss of some decision-making at the local level, may well offset the advantages of fuller banking services and possibly more aggressive and/or efficient management (1970, p. 326)." Large banking systems bring a more complete range of services to a community while smaller organizations offer familiarity and greater personal interest. Solomon's concern is that mergers will eliminate the strongest local bank. In cases such as this, branching or mergers should be prohibited since they substantially lessen competition. Interfirm organizations can also reduce interbank rivalry. The largest banks can attain a

position of leadership that allows them to encourage homogeneity of prices and other modes of competition.

Research conducted by Shull (1976) indicated that multiple-office banking leads to fewer banks and higher concentration at the state level. However, branch banking also resulted in new entry by established banking organizations into local banking markets, thus increasing rivalry. A later study by Heggestad and Mingo (1978, p. 649) concluded the local nature of banking markets limits the choices available to consumers and "the existence of competition within local markets is [therefore] very important since market forces are relied upon to constrain bank pricing and output decisions." Heggestad and Mingo found that where low levels of concentration exist, competition exists and where a market is highly concentrated, "effective monopoly" is present.[1] Research conducted by Alcaly, Taddesse and Weisbrod (1980) indicated that branch banks would act as a competitive force in local markets and discourage collusion between local banks.

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1. "Effective monopoly" is a market situation in which a single bank or a small number of banks dominate. Heggestad and Mingo's (1978) study indicated that "effective competition" is apparently absent in highly concentrated local markets.

A possible disadvantage of branching is the anti-competitive effects of increased concentration at the state level. As branching restrictions are loosened and the number of banks declines, the opportunity for collusion exists. In a concentrated industry such as banking, banks may be able to collude, curtail supply, and charge prices above the competitive level. The creation of interdependencies and the resultant collusive behavior among banks is called the linked-oligopoly or mutual forbearance hypothesis.[2] A study by Heggestad and Rhoades (1978a) examined the development of mutual forbearance in banking markets where mutual forbearance is defined as a "live and let live" philosophy in a market resulting from the fact that an action by a firm in one area may induce retaliation by competitors in an area where the firm is vulnerable. Their research concluded that banks in dominant market positions do behave in such a manner as to lower the degree of rivalry within markets. They found that when concentration for the banking industry was high, rivalry was low. In a later

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2. "Linked-oligopoly" is a market condition in which sellers are so few that the actions of any one of them will materially affect price and hence have a measurable impact upon competitors. Collusion among competitors is pursued in order to reduce the detrimental aspects of an action on the industry.

study by Heggestad and Rhoades (1978b), the evidence was mixed. The authors maintained that geographic expansion created interdependencies among banks at the state level. However, the researchers also found evidence that fewer branching restrictions led to an increase in bank competition. Heggestad and Rhoades (1978b, p. 50) qualify this finding on the apparent aggressive conduct of banks in statewide branching states by attributing it to "a short-run disequilibrium situation in interbank relationships, a disequilibrium that may disappear as firms become familiar with each other." As banking organizations reach the finite boundaries of geographic expansion, a spirit of cooperation prevails. The aggressive behavior of banks in states with liberal branching laws is eventually suppressed in favor of interbank cooperation. Therefore, the research of Heggestad and Rhoades indirectly supports the linked-oligopoly hypothesis.

Number of Offices in States

A study by Anderson (1964) compared Vermont which allowed branching and New Hampshire which did not. The data indicated that branching in Vermont provided more offices relative to population than did unit banking in New Hampshire. The greater number of facilities in

Vermont were supplied at no greater cost per person than the less convenient New Hampshire banks. These conclusions paralleled those of Gilbert and Longbrake (1973). Based on a time-series study, Gilbert and Longbrake discovered that the number of banking offices increased more rapidly in response to changes in per capita income, population and population concentration in statewide branching states than in either unit banking or limited branch banking states. Savage and Humphrey (1979) found that bank structure is an important aspect of the office availability issue. Their study replicated and extended a 1947-1960 study by Lanzillotti and Saving (1969). Savage and Humphrey (1979, p. 228) concluded that by 1975 there were "significantly more banking offices in limited branching states than in unit banking states, but there was no difference between limited and statewide branching states."

Number of Offices in Metropolitan Areas

Seaver and Fraser (1976) attempted to determine if greater numbers of bank offices are available in local markets under different branching restrictions. They examined all SMSAs in the United States in 1970. The researchers found that the increase in the number of banking offices as branching laws are liberalized is

insignificant. Banking offices in states that allow statewide branching do not serve a smaller number of people per office than banks in limited branching states. The authors acknowledge that the impact of branching limitations on the availability of banking facilities in nonmetropolitan areas may be more severe than in urban communities.

Number of Offices in Rural Areas

A measure of the convenience offered by banks is the number of offices available within a community. Intuitively it appears that branch banking should offer rural areas a greater number of bank offices. Regulatory authorities would be more likely to approve an application for a bank office than a new bank charter in nonmetropolitan areas. Research by Gilbert and Longbrake (1973) suggested that in nonmetropolitan areas, branching states provide the largest number of bank offices per capita. Jessup and Stolz (1975) found that rural residents have significantly less banking choices in unit banking states than in similar states permitting statewide branching. Their study examined six southern states representing the three major categories of branching structure.

Bank Structure and the Availability and Cost of Bank Services

Availability of Services

Small nonmetropolitan banks have not been able to offer as many customer services as larger banks due to insufficient demand by local residents to cover the cost of providing these services, or a lack of competition encouraging banks to increase services. Horvitz and Shull (1964) tried to determine the influence of branch banking on the variety and convenience of the services banks offered. Their data indicated that bank mergers and bank acquisition by holding companies resulted in an average of five new services offered to the community. The most important of the new services were instalment loans, VA or FHA mortgage loans, trust services, home improvement loans and special checking accounts. Stolz (1976) analyzed the effects of market structure on bank conduct and performance in nonmetropolitan regions. His study delineated and examined 75 rural markets in Iowa, Minnesota, and Wisconsin. The results showed that decreases in rural banking market concentration have both favorable and adverse consequences. On the positive side, branching seems to be

associated with increases in certain types of non-price effort, such as, an increase in the total hours a bank is open Monday to Friday other than the core period (9:00 a.m. to 3:00 p.m.) and the availability of 24-hour automated banking. The negative impacts of merger include a decline in other non-price efforts, such as, the total hours a bank is open on Saturday and the availability of a bank credit card.

McCall (1980) suggests several reasons for mergers resulting in the offering of new services. Mergers or acquisitions may have merely corrected a bank's previous failure to have offered needed services. Bank regulatory authorities may be inclined to look more favorably on a merger or acquisition if a greater number of services will be provided. Finally, consolidation of limited local demands under a large organization may have made it economically feasible to offer the new services in branch office communities.

Cost of Services

The conclusions that have been reached relating to bank structure and service cost differentials are tentative. One measure of cost is the service charge banks demand on checking accounts. Anderson's (1964)

study of Vermont and New Hampshire found that service charges on checking accounts were lower in Vermont where branching was allowed. Horvitz and Shull (1964) indicated large banks had higher service charges on checking accounts than small banks. Heggestad and Mingo (1977) also found that service charges increase with bank size rather than fall. In addition, the data of Heggestad and Mingo indicated that banks in markets where rapid growth or high per capita income exist charge higher prices for customer services.

The provision of services can also have an indirect cost. Unit banks claim that non-basic services can be provided through correspondent banks; however, the correspondent system may not be beneficial to rural areas. Gilbert and Longbrake (1973) maintain that the correspondent system impedes the flow of funds among rural banks. In return for services, small unit banks keep non-interest bearing deposits with correspondents. This flow of funds from small rural to large metropolitan banks may reduce rural capital and inhibit the ability of small banks to meet local credit needs.

Bank Structure and the Availability of Credit

Banks must reconcile the conflicting goals of solvency,[3] liquidity,[4] and profitability. One purpose of reserve requirements is to insure some minimum level of bank liquidity. The most liquid asset a bank can hold is cash (primary reserves). Low-risk, low-yielding assets, such as U.S. Government securities (secondary reserves), also preserve a banks' liquidity. These assets have no credit risk, very little market risk and can be turned into money within a year by reason of a short-term maturity date. These secondary reserves serve to protect against either regular or unexpected cash withdrawals. Bank liquidity is subject to the deposit structure of the bank (time deposits versus demand deposits), the economic structure of the community, the composition and maturity pattern of a bank's loan and investment portfolio, legal requirements and management attitudes. Bank objectives of maximizing profits by increasing holdings of risk assets, i.e., loans, and maximizing safety by increasing liquidity are usually in opposition.

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3. A bank is solvent when its assets are greater than its liabilities.

4. Liquidity is the ease and certainty with which an asset can be turned into money.

Commercial banks generally use their depositors' funds for required reserves, for granting loans and for purchasing securities. Banks make loans and purchase securities from their excess reserves.[5] Both loans and securities have certain advantages and disadvantages. Loans yield higher returns but usually carry a higher degree of risk than other investments. Securities have little risk associated with them but are less profitable than loans. Banks aggressively searching for higher profits often liquidate substantial amounts of their holdings of U.S. Treasury securities and increase their loans outstanding. This behavior increases the loan-deposit ratio of the bank and reduces the liquidity of the portfolio.

Loans are thought to facilitate private investment in communities, while bank purchases of securities can have a beneficial or detrimental effect on the provision of credit to local customers depending on whether banks purchase U.S. Government, state or local securities. The type of bonds a bank holds has an impact on bank loan assets and the flow of funds within a

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5. Excess reserves is equal to total reserves minus required reserves.

community. In addition, differences in commercial bank loan and security holdings are associated with differences in bank structure.

Loans

Many studies[6] use the loan-to-deposit ratio (LDR) of commercial banks in examining structure as a determinant of the flow of credit to local communities. The LDR is a good indicator because it measures relative bank output and indicates how easily customers are able to attain credit. Higher LDRs indicate that more of the available funds are disbursed to borrowers. Presumably, the local borrowers then reap the primary benefits. The LDR also measures a bank's risk exposure since loans are generally more risky than other investments.[7]

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6. Edwards (1965), Eisenbeis (1975) and Horvitz and Shull (1964) utilized the ratio of outstanding loans to outstanding deposits as a proxy for credit availability.

7. A shortcoming with using LDRs is that some of the loans outstanding may not represent credit extended to local residents and businesses. Therefore, the bank's LDR overestimates the amount of credit allocated locally if the bank participated in non-local loans. Alternatively, if a bank sells loans out of its portfolio or solicits participation in local loans, the LDR will underestimate the availability of credit.

Small banks tend to hold a larger proportion of their assets in liquid form, such as cash and Treasury bills, than large banks because of an inability or unwillingness to acquire short-term funds through the money markets. This results in additional liquidity, a reduction in the amount of loans that could be granted and a decline in a bank's LDR. Horvitz and Shull (1964) proposed that this extra liquidity may be designed to maximize profits in an imperfect market, i.e., where a bank has monopoly power. The LDR is affected by price elasticities; a bank with monopoly power can restrict the supply of loans and keep the price artificially high. The high price of loans dampens the demand for loans and depresses the LDR. Alternatively, a bank may have extra liquidity because it is meeting some target return and not maximizing profits. A banks' liquidity position might also reflect poor management. Edwards (1965) suggests that LDRs are affected by a bank's "risk taking" function; the ratio would decline as the bank became more conservative. As a result of monopolistic and conservative bank behavior, small banks may be providing less credit to their communities than they otherwise could.

Small banks, many of which are in rural areas, make fewer loans as a percentage of deposits, make very

few business loans and hold a larger proportion of assets in safe securities than do larger banks. For these reasons, small rural banks are often criticized for not meeting the credit needs of their community. Rural banks are also accused of exporting funds rather than using them locally. Hopper (1971) describes this one-way flow. Rural funds are deposited in local banks; the banks put the money into the bond market, insurance companies, pension and trust funds. These investment institutions are usually located in cities and the recipients of this natural outflow of rural funds.

To some degree, Verbrugge (1975) defends the above investment strategies of rural credit institutions. He believes it should be expected that rural banks behave differently from urban banks. Rural banks are not able to diversify their loan portfolios to the extent large metropolitan banks can, therefore rural banks maintain a lower LDR in order to reduce risk. Rural banks are often more concerned with the quality rather than the quantity of loans granted. Nonmetropolitan banks have conservative lending policies which are designed to produce a loan loss of zero. Rural banks that try to minimize risk subsequently make fewer long-term loans. Verbrugge thinks it is unfair to expect small banks to provide the long-term credit

necessary for capital expansion when most large banks refuse to do so. Rhoades and Savage (1981) discovered small banks can perform better than larger organizations in providing certain types of credit. An analysis of large and small banking organizations in 297 SMSAs found loan ratios indicating smaller banks commit a higher percentage of assets to real estate loans and loans to individuals than larger banks.

Earlier studies suggest that branching structure is also an explanatory factor of differences in bank LDRs. Fraser and Rose (1972), using data for Texas, northern Louisiana, southern New Mexico, southern Arizona and southern Oklahoma, found the ratio of loans to assets rose and banks placed more emphasis on business and consumer loans when the structure of the market was liberalized. Fraser and Rose also noted that bank entry into a market area was motivated by the anticipation of future profits resulting from an expansion of credit to the local area. Graddy and Kyle (1980) found that bank holding company affiliates held a smaller proportion of total assets in U.S. Government securities and a larger proportion of total assets in loans and local securities than did their independent counterparts. Statewide branching structure data examined by McCall (1980, p. 104) led him to conclude that "banks consistently

employ a greater proportion of their resources for loans when they operate in broader branching states than in unit banking states." The higher LDRs of branch banks may reflect the greater deposit stability and concomitant lower liquidity needs of multi-office banks than unit banks. However, a high LDR does not indicate if loans are being granted to fulfill local community needs. Money that is loaned may be invested outside the community or primarily in the metropolitan areas. Where statewide branching is permitted, the credit needs of nonmetropolitan areas may be forsaken. The banking organization could move rural funds to more lucrative urban areas although the evidence supporting this hypothesis is sketchy.

Data from a study by Eisenbeis (1975, p. 46) did not support the hypothesis that branching results in a reallocation of funds from local areas. His study examined the lending practices of similar size SMSA banks in branching and unit-banking states. He concluded that "statewide branching may on average result in the provision of a greater relative volume of loans to local markets." It appeared banks made more business loans within their own market area in statewide branching states than in either unit banking or limited branching states.

Cost of Funds

Horvitz and Shull (1964, p. 145) found that branching may permit a spreading of risks through the geographic distribution of offices. This diffusion of risk may result in a reduction in costs for the bank and ultimately lower costs for customers. From an efficiency and profitability standpoint though, Horvitz and Shull contended that "unit banks can attain minimum optimum size at substantially lower asset sizes than branch banks." Gilbert and Longbrake (1974) also concluded that unit bank costs are less for offices that handle a relatively small average number of accounts. Branch bank average costs decline and unit bank average costs increase as the average number of accounts per office rises. Therefore, the diseconomies of branching can be overcome by fairly extensive branching while unit banks have no way to grow to efficient size in a constrained market.

The cost to customers of branching versus unit banking can be analyzed with respect to the price banks charge on funds to borrowers and pay to depositors. A study by Horvitz and Shull (1964) concluded that bank mergers generally benefited the customer. Mergers resulted in saving deposit rate increases and rates on mortgage loans, instalment loans and business loans

decreasing. Jacobs (1971) conducted a study of the relationship of market structure to the performance of banks in supplying services to businesses. His data indicated that small firms pay higher loan rates as branching restrictions are tightened.

Loans and Profitability at Rural Banks

In an analysis of 98 predominantly rural unit banks in formerly one-bank towns, Chandross (1971) indicated that during the three year period preceding competition the banks had significantly above average levels of earnings. By way of explanation, he suggests the banks were undercapitalized and it was therefore necessary to generate above average returns so stockholders would be induced to accept a higher degree of risk. Chandross' study revealed that the primary reason for customer dissatisfaction in one-bank towns was bank lending policies. Loan policy was often dependent on the local business interests of the bank's major stockholders and directors. In addition, banks in rural areas did not like to enter each other's market area and were reluctant to grant a loan to an applicant who could not get credit at his local bank. Even if a bank outside the borrower's immediate area did offer to finance the loan, the applicant may have faced higher rates.

The higher loan rates are due to the extra information costs encountered by the bank and the probability of a high-risk evaluation on the loan application. Chandross (1971, p. 30) concluded that competition in market areas resulted in a "significant expansion in loan output [which was] undoubtedly of considerable benefit to ... customers, especially in view of the fact that alternative sources of credit are quite limited in the rural areas where most of them were located."

Where differently structured banks exist in the same community, Lee and Reichert (1978) found that independent banks can compete effectively with holding company banks. Their data from a study of rural Ohio affiliated and independent banks found there was no significant difference in the profitability of the two groups. Compared to independent banks, affiliated banks granted more higher yielding instalment loans than farm loans or residential mortgages. Affiliated banks payed higher rates of interest on interest bearing deposits and government deposits made up a larger proportion of total deposits. Independent banks though were able to offer a wide range of services and were superior in areas such as farm management counseling.

Harvey (1980) developed a model to simultaneously measure the influence of bank structure on the cost of funds purchased and the return on funds sold in rural banking markets. The results of Harvey's study indicated that market structure does have an effect on the price banks pay for borrowed funds and the price they charge for loanable funds. Specifically, an increase in branch banks in a market is followed by a decrease in the average loan interest rate charged to customers and a decrease in the return on funds sold by the banks. Harvey's study also indicated that the stronger the market power of a bank, the greater the profitability. He found that the number of banks in a rural market may be more important in reducing borrower loan costs than the concentration of bank resources.

In conclusion, with respect to all banking services, no one particular type of organizational structure is superior to all others. Apparently though, competition influences banks in the local market to better serve local credit needs.

Securities

An alternative to loans for commercial banks is to invest in federal, state and local government securities.[8] Commercial banks enter the bond market in search of increased profitability. State and local government securities entail greater risk than federal securities but yield a larger after-tax return. When a bank buys state and local government bonds, the interest income is exempt from income taxes by the federal government and sometimes also from state income taxes. This feature reduces a bank's tax liabilities and increases after-tax profits.

Commercial bank behavior in the bond market is usually influenced by the prevailing monetary-credit policy of the Federal Reserve. Banks purchase securities when large reserves are available for investment. This often occurs during recessionary periods when the demand for bank credit is falling and the Federal Reserve is pursuing an expansionary monetary policy. Bank purchases of municipals declines during periods of economic upturn when higher quality loans are available.

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8. Commercial banks may purchase general obligation bonds, which are collateralized by the general taxing power of the issuer or bonds classified as revenue bonds but collateralized indirectly by the municipal government unit.

As expected, the portfolio behavior of small and large banks in metropolitan and nonmetropolitan regions differs. Fraser and Rose (1972) concluded that multiple office banks held fewer U.S. Government securities than independent banks and made available a larger proportion of credit to local businesses and individuals. Multi-office banks keep a greater proportion of their assets in state and municipal securities than unit banks. These securities are riskier and more profitable than Treasury bills. Verbrugge (1975) found that small banks with less than $25 million in assets held a greater proportion of their total assets in U.S. securities than do larger banks. This indicates that local funds were being exported to national money markets. Ho and Shaffer's (1979) study also gave a weak indication that bank purchases of U.S. securities may be detrimental to the local economy since local bank purchases of U.S. government bonds result in local capital outflows.

The incentive for a local bank to purchase local tax-exempt securities is a desire to secure and maintain the deposits of local government units. Kaufman (1981, p. 25) states that "most underwriting firms are small and concentrate on bonds issued by municipalities in their own geographical regions." The problem with bond

holdings is that banks usually have difficulty disposing of them once they have been acquired. For this reason, banks usually view their holdings of municipal securities as having no greater liquidity than that possessed by local loans.

Banks that underwrite municipal bonds may be in a position to exercise monopoly power. West (1966, p. 307) examined the underwriting competition for state government general-obligation bonds. When a single bid was received on municipal bond offerings, the net interest rate averaged nearly one-quarter percent above the competitive level. West determined that "monopsonistic underwriting was consistently associated with net interest costs materially above the rates paid by issuers of similar multiple-bid offerings." Issuers of municipal bonds have few choices if market forces are not consistent with adequate voluntary bidding and this is often the case in rural areas. The rates paid by issuers will probably be higher than in competitive bidding situations. Sorensen (1979) suggests that in the absence of bid competition, it may be less costly for the municipality or state to sell bonds by negotiation. In a study that examined the effects of allowing commercial banks to underwrite college revenue bonds,

Rogowski (1980) found that the increase in competition reduced issuer borrowing costs. It was not determined if the entire revenue market responds to commercial bank underwriting in a similar manner.

Bank Credit and Rural Community Development

The behavior of commercial banks in the bond market and in making loans has welfare implications for rural communities. Banks play an intermediary role in the growth process and are presumed to assist the growth process by providing loans at competitive rates of interest. Loans, especially those made to businesses, finance increases in local employment, spending, output and income.

When a bank increases reserves, an opportunity is created to increase the aggregate amount of loanable funds. A method of gaining reserves, besides increasing deposits, is for commercial banks to import capital. Banks facilitate the movement of reserves into local economies by underwriting state and local government securities. The sale of bonds facilitates financing for the development of adequate infrastructure in a region. This type of public investment is necessary for development to occur because many small communities do not have a sufficient tax base to finance the building of

highways, sewage treatment plants and other public facilities. When municipal bonds are purchased by non-resident households and firms, the amount of available capital in an area is increased. The community can also attract industry into the area through industrial development bonds.[9]

Loan Growth and Regional Economic Growth

Several studies have examined the role of credit in the growth process. It is generally thought that growth in a region is based on a leading export sector. This sector increases local employment; the creation of jobs and an increase in spending is a precondition for increased deposit and reserve flows to local banks. Increases in reserves engender increases in loans, which further fuel investment and growth.

Minsky's (1965) study of California indicated a central role for commercial banks in the regional growth process. He implied a causal relationship between bank

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9. Industrial development bonds generate revenue for the construction of plants and the purchase of equipment. Industrial development bonds are eventually retired by the revenues generated from the leasing agreement between the private firm and public agency. The leasing agreement secures the development bond; therefore, the community's credit rating and ability to borrow are not impaired.

lending behavior and economic growth. Minsky contended that in rapidly growing regions, the availability of credit was vital. Minsky (1965, p. 101) concluded the

> essential role of commercial banks in the growth process is that they supply "loan" capital to (a) those local enterprises which must grow at least at the same rate as the local economy, and (b) those export enterprises which are too small, and perhaps too new, to be able to generate nationally-acceptable liabilities.

Dreese (1974) conducted a study to determine how bank lending behavior influences economic growth in forty Appalachian counties. His data indicated that bank loan growth and employment are positively related but, the direction of causality is unknown. Dreese suggested employment growth may be a better indicator of loan growth than the reverse. Therefore, loan growth would not be an effective catalyst for employment and economic growth. Liberal branching laws were significantly related to loan growth but not to employment growth. This finding led Dreese (1971, p. 647) to conclude the relationship between bank structure and economic growth is weak; in general, he determined it was "unlikely that banks or bankers play a significant or distinct role in regional growth."

Ho and Shaffer (1979) studied the simultaneous relationship between banking activities and the rate of

local economic growth. They examined the potentially different effects on the local economy from specific types of bank loans as well as non-loan investment options. They found that higher levels of income can be generated by granting loans that will increase production. As income levels rise, commercial banks experience a growth of demand deposits. These deposits are then used to make loans available to enterprises and perpetrate the growth cycle. In nonmetropolitan counties, the study indicated increases in the average amount of aggregated loans had a particularly strong and positive impact on the change in per capita income.

In conclusion, bank financing is an important and necessary aspect of the development process in a community. However, more research is needed to further establish the empirical relationship between commercial banks and their contribution to community growth and the advantages and shortcomings of bank structure as related to the extension of local credit. The purpose of this study is to analyze what I believe to be the principal unresolved issue in bank structure: Does branch banking result in the reduction of loanable funds for nonmetropolitan communities?

CHAPTER 3

DATA SOURCES AND METHODOLOGY

The structure of the commercial banking system in a state is determined by geographical restrictions. These restrictions limit the amount of bank branching that may take place and may alter the flow of credit to rural areas. Banking regulations generally allow statewide branching, limited branching[1] or unit banking. Statewide branching permits the relatively free transfer of funds from one area branch office to another branch office in a different area of a state. Unit banking is inherently more restrictive of funds movement and forces unit banks to rely on the correspondent system. Liberalized branching laws are also associated with a decrease in the number of banking organizations operating in a state, an increase in the average size of a bank's assets and an increasing proportion of the total deposits in a state being held by a decreasing number of banks.

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1. Limited branch banking permits a bank to establish more than one office within a county or permits a bank to operate offices in surrounding counties.

To ascertain if bank structure influences the availability of credit to nonmetropolitan communities, the loan-to-deposit ratios (LDRs) of nonSMSA banks in a unit banking state (Colorado) will be compared with the LDRs of nonSMSA branch offices where statewide branching is permitted (Arizona). The single-equation regression model is utilized to test if unit banks act differently from branch banking organizations when allocating credit. The issue investigated is whether the deposits of nonmetropolitan residents in a branch banking state are transferred to urban loan customers, and if so, does this transfer result in smaller LDRs for rural communities than would have existed under a unit banking structure? Structural characteristics of the market in which the banks operate are accounted for by including the appropriate independent variables.

Data Sources

The study sample consists of 151 banks in 112 Colorado nonSMSA communities and 87 bank offices in 53 Arizona rural communities.[2] Banks in Colorado are

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2. The towns included in the study were either located in nonSMSA counties or a minimum of 30 miles from a central city of 50,000 or more people. This delineation was used because counties in Arizona are large and the SMSA counties (Pima and Maricopa) contain some towns that are really very rural, such as Gila Bend, Ajo and Wickenburg.

subject to unit banking restrictions, while banks in Arizona operate under statewide branching restrictions. The home offices of banking organizations provided bank data by branch office in Arizona. The 87 bank offices studied in Arizona represent eight banking organizations with the three largest banks accounting for all but nine of the offices and 85% of the state's deposits. Banking data for Colorado was taken from Polk's World Bank Directory and Federal Reserve Bank data tapes.

Nonbanking data that identified community characteristics and was used to derive several independent variables were taken from the latest available Census of Population, Census of Agriculture, Directories of Manufactures, SBA Annual Reports, and Census of Retail Trade. When community data was not available from secondary sources, county data was substituted. The interested reader may refer to Appendix A for a complete summary of the sources of bank and community related data.

Regression Models

The bank or community LDRs were hypothesized to be a function of bank structure, competition and management behavior, the employment structure of the community,

and the economic and demographic characteristics of the local banking market. Ordinary least squares (OLS) regression analysis was used to estimate the impact of explanatory variables on the availability of credit to nonmetropolitan communities. Specifically, the functional relationships tested were:

1) $$ALDR_{azco} = \alpha_0 + \alpha_1 BS + \alpha_2 CS + \alpha_3 SBA + \alpha_4 SBA^2 + \alpha_5 SZ + \alpha_6 SZ^2 + \alpha_7 SZ \cdot BS + \alpha_8 SZ^2 \cdot BS + \alpha_9 EP + \alpha_{10} PCY + \alpha_{11} PCY^2 + \alpha_{12} RS + \alpha_{13} RS^2 + \alpha_{14} PR \cdot BS + \alpha_{15} PR^2 \cdot BS + \alpha_{16} MFG + \alpha_{17} AG + \alpha_{18} MN + \alpha_{19} SV + \alpha_{20} TR + \alpha_{21} UN + \alpha_{22} UN^2 + \alpha_{23} BP + \alpha_{24} AM + \alpha_{25} C + \alpha_{26} STM + \alpha_{27} PNL$$

1a) $$LNALDR_{azco} = \alpha_0 + \alpha_1 BS + \alpha_2 CS + \alpha_3 SBA + \alpha_4 SBA^2 + \alpha_5 SZ + \alpha_6 SZ^2 + \alpha_7 SZ \cdot BS + \alpha_8 SZ^2 \cdot BS + \alpha_9 EP + \alpha_{10} PCY + \alpha_{11} PCY^2 + \alpha_{12} RS + \alpha_{13} RS^2 + \alpha_{14} PR \cdot BS + \alpha_{15} PR^2 \cdot BS + \alpha_{16} MFG + \alpha_{17} AG + \alpha_{18} MN + \alpha_{19} SV + \alpha_{20} TR + \alpha_{21} UN + \alpha_{22} UN^2 + \alpha_{23} BP + \alpha_{24} AM + \alpha_{25} C + \alpha_{26} STM + \alpha_{27} PNL$$

$$2)\quad ATLDR_{azco} = \alpha_0 + \alpha_1 BS + \alpha_2 CS + \alpha_3 SBA + \alpha_4 SBA^2 + \alpha_5 SZ + \alpha_6 SZ^2 + \alpha_7 SZ \cdot BS + \alpha_8 SZ^2 \cdot BS + \alpha_9 EP + \alpha_{10} PCY + \alpha_{11} PCY^2 + \alpha_{12} RS + \alpha_{13} RS^2 + \alpha_{14} PR \cdot BS + \alpha_{15} PR^2 \cdot BS + \alpha_{16} MFG + \alpha_{17} AG + \alpha_{18} MN + \alpha_{19} SV + \alpha_{20} TR + \alpha_{21} UN + \alpha_{22} UN^2 + \alpha_{23} BP + \alpha_{24} AM + \alpha_{25} C + \alpha_{26} CTM + \alpha_{27} PNL$$

$$2a)\quad LNATLDR_{azco} = \alpha_0 + \alpha_1 BS + \alpha_2 CS + \alpha_3 SBA + \alpha_4 SBA^2 + \alpha_5 SZ + \alpha_6 SZ^2 + \alpha_7 SZ \cdot BS + \alpha_8 SZ^2 \cdot BS + \alpha_9 EP + \alpha_{10} PCY + \alpha_{11} PCY^2 + \alpha_{12} RS + \alpha_{13} RS^2 + \alpha_{14} PR \cdot BS + \alpha_{15} PR^2 \cdot BS + \alpha_{16} MFG + \alpha_{17} AG + \alpha_{18} MN + \alpha_{19} SV + \alpha_{20} TR + \alpha_{21} UN + \alpha_{22} UN^2 + \alpha_{23} BP + \alpha_{24} AM + \alpha_{25} C + \alpha_{26} CTM + \alpha_{27} PNL$$

$$3)\quad ALDR_{az} = \alpha_0 + \alpha_1 BS + \alpha_2 CS + \alpha_3 SBA + \alpha_4 SBA^2 + \alpha_5 SZ + \alpha_6 SZ^2 + \alpha_7 SZ \cdot BS + \alpha_8 SZ^2 \cdot BS + \alpha_9 EP + \alpha_{10} PCY + \alpha_{11} PCY^2 + \alpha_{12} RS + \alpha_{13} RS^2 + \alpha_{14} PR \cdot BS + \alpha_{15} PR^2 \cdot BS + \alpha_{16} MFG + \alpha_{17} AG + \alpha_{18} MN + \alpha_{19} SV + \alpha_{20} TR + \alpha_{21} UN + \alpha_{22} UN^2 + \alpha_{23} BP + \alpha_{24} AM + \alpha_{25} C + \alpha_{26} STM + \alpha_{27} PNL$$

3a) $LNALDR_{az} = \alpha_0 + \alpha_1 BS + \alpha_2 CS + \alpha_3 SBA + \alpha_4 SBA^2 + \alpha_5 SZ + \alpha_6 SZ^2 + \alpha_7 SZ \cdot BS + \alpha_8 SZ^2 \cdot BS + \alpha_9 EP + \alpha_{10} PCY + \alpha_{11} PCY^2 + \alpha_{12} RS + \alpha_{13} RS^2 + \alpha_{14} PR \cdot BS + \alpha_{15} PR^2 \cdot BS + \alpha_{16} MFG + \alpha_{17} AG + \alpha_{18} MN + \alpha_{19} SV + \alpha_{20} TR + \alpha_{21} UN + \alpha_{22} UN^2 + \alpha_{23} BP + \alpha_{24} AM + \alpha_{25} C + \alpha_{26} STM + \alpha_{27} PNL$

4) $ALDR_{co} = \alpha_0 + \alpha_1 BS + \alpha_2 CS + \alpha_3 SBA + \alpha_4 SBA^2 + \alpha_5 SZ + \alpha_6 SZ^2 + \alpha_7 SZ \cdot BS + \alpha_8 SZ^2 \cdot BS + \alpha_9 EP + \alpha_{10} PCY + \alpha_{11} PCY^2 + \alpha_{12} RS + \alpha_{13} RS^2 + \alpha_{14} PR \cdot BS + \alpha_{15} PR^2 \cdot BS + \alpha_{16} MFG + \alpha_{17} AG + \alpha_{18} MN + \alpha_{19} SV + \alpha_{20} TR + \alpha_{21} UN + \alpha_{22} UN^2 + \alpha_{23} BP + \alpha_{24} AM + \alpha_{25} C + \alpha_{26} STM + \alpha_{27} PNL$

4a) $LNALDR_{co} = \alpha_0 + \alpha_1 BS + \alpha_2 CS + \alpha_3 SBA + \alpha_4 SBA^2 + \alpha_5 SZ + \alpha_6 SZ^2 + \alpha_7 SZ \cdot BS + \alpha_8 SZ^2 \cdot BS + \alpha_9 EP + \alpha_{10} PCY + \alpha_{11} PCY^2 + \alpha_{12} RS + \alpha_{13} RS^2 + \alpha_{14} PR \cdot BS + \alpha_{15} PR^2 \cdot BS + \alpha_{16} MFG + \alpha_{17} AG + \alpha_{18} MN + \alpha_{19} SV + \alpha_{20} TR + \alpha_{21} UN + \alpha_{22} UN^2 + \alpha_{23} BP + \alpha_{24} AM + \alpha_{25} C + \alpha_{26} STM + \alpha_{27} PNL$

5) $ATLDR_{az} = \alpha_0 + \alpha_1 BS + \alpha_2 CS + \alpha_3 SBA + \alpha_4 SBA^2 + \alpha_5 SZ + \alpha_6 SZ^2 + \alpha_7 SZ \cdot BS + \alpha_8 SZ^2 \cdot BS + \alpha_9 EP + \alpha_{10} PCY + \alpha_{11} PCY^2 + \alpha_{12} RS + \alpha_{13} RS^2 + \alpha_{14} PR \cdot BS + \alpha_{15} PR^2 \cdot BS + \alpha_{16} MFG + \alpha_{17} AG + \alpha_{18} MN + \alpha_{19} SV + \alpha_{20} TR + \alpha_{21} UN + \alpha_{22} UN^2 + \alpha_{23} BP + \alpha_{24} AM + \alpha_{25} C + \alpha_{26} CTM + \alpha_{27} PNL$

5a) $LNATLDR_{az} = \alpha_0 + \alpha_1 BS + \alpha_2 CS + \alpha_3 SBA + \alpha_4 SBA^2 + \alpha_5 SZ + \alpha_6 SZ^2 + \alpha_7 SZ \cdot BS + \alpha_8 SZ^2 \cdot BS + \alpha_9 EP + \alpha_{10} PCY + \alpha_{11} PCY^2 + \alpha_{12} RS + \alpha_{13} RS^2 + \alpha_{14} PR \cdot BS + \alpha_{15} PR^2 \cdot BS + \alpha_{16} MFG + \alpha_{17} AG + \alpha_{18} MN + \alpha_{19} SV + \alpha_{20} TR + \alpha_{21} UN + \alpha_{22} UN^2 + \alpha_{23} BP + \alpha_{24} AM + \alpha_{25} C + \alpha_{26} CTM + \alpha_{27} PNL$

6) $ATLDR_{co} = \alpha_0 + \alpha_1 BS + \alpha_2 CS + \alpha_3 SBA + \alpha_4 SBA^2 + \alpha_5 SZ + \alpha_6 SZ^2 + \alpha_7 SZ \cdot BS + \alpha_8 SZ^2 \cdot BS + \alpha_9 EP + \alpha_{10} PCY + \alpha_{11} PCY^2 + \alpha_{12} RS + \alpha_{13} RS^2 + \alpha_{14} PR \cdot BS + \alpha_{15} PR^2 \cdot BS + \alpha_{16} MFG + \alpha_{17} AG + \alpha_{18} MN + \alpha_{19} SV + \alpha_{20} TR + \alpha_{21} UN + \alpha_{22} UN^2 + \alpha_{23} BP + \alpha_{24} AM + \alpha_{25} C + \alpha_{26} CTM + \alpha_{27} PNL$

$$6a)\ LNATLDR_{co} = \alpha_0 + \alpha_1 BS + \alpha_2 CS + \alpha_3 SBA + \alpha_4 SBA^2 + \alpha_5 SZ + \alpha_6 SZ^2 + \alpha_7 SZ \cdot BS + \alpha_8 SZ^2 \cdot BS + \alpha_9 EP + \alpha_{10} PCY + \alpha_{11} PCY^2 + \alpha_{12} RS + \alpha_{13} RS^2 + \alpha_{14} PR \cdot BS + \alpha_{15} PR^2 \cdot BS + \alpha_{16} MFG + \alpha_{17} AG + \alpha_{18} MN + \alpha_{19} SV + \alpha_{20} TR + \alpha_{21} UN + \alpha_{22} UN^2 + \alpha_{23} BP + \alpha_{24} AM + \alpha_{25} C + \alpha_{26} CTM + \alpha_{27} PNL$$

where:

ALDR = Average loan-to-deposit ratio by bank office, 1977-1980.

LNALDR = Log of the average loan-to-deposit ratio by bank office, 1977-1980.

ATLDR = Average loan-to-deposit ratio by community, 1977-1980.

LNATLDR = Log of the average loan-to-deposit ratio by community, 1977-1980.

azco = Combined data for Arizona and Colorado.

az = Data for Arizona only.

co = Data for Colorado only.

BS = Dummy variable for bank structure (1 for branch bank, 0 for unit).

CS = Number of alternative credit sources in the community (banks, savings and loans, credit unions, loan companies).

SBA = Dollar volume of small business administration loans by community (1977 through 1980).

STM = Time and savings-to-total deposit ratios for each bank, 1980.

CTM = Time and savings-to-total deposit ratios for each community, 1980.

SZ = Bank size in terms of deposits.

PR = 1980 to 1970 population ratio by community.

EP = Elderly population, i.e., percent of communities 1980 population over 65 years old.

RSR = Ratio of 1977 to 1972 community retail sales.

PCY = Percentage change in estimated per capita income by community.

AG = Percentage employed in agriculture by county, 150 days or more, 1978.

MN = Percentage employed in mining by county, 1980.

SV = Percentage employed in service occupations by county, 1980.

MFG = Percentage employed in manufacturing by county, 1980.

TR = Percentage employed in wholesale and retail trade by county, 1980.

UN = Percentage unemployed by county, 1980.

BP = Percentage of community's manufacturing and mining work force employed in branch plants.

AM = Dummy variable for adjacent to metropolitan area (1 for adjacent, 0 for not adjacent).

PNL = Percentage of manufacturing and mining work force employed by the largest industry in a town.

C = Dummy variable for college town (1 for yes, 0 for no).

Dependent Variables (Loan-to-Deposit Ratios)

Bank Loan-to-Deposit Ratios (ALDR). The availability of credit to rural communities is measured in terms of the average loan-to-deposit ratio (ALDR). The ALDR is computed for each bank office using the equation:

$$ALDR = \frac{AL}{AD}$$

where,

AL = bank office average loans, 1977-1980

AD = bank office average deposits, 1977-1980

Community Loan-to-Deposit Ratios (ATLDR). A weighted ALDR is also computed for communities in which more than one bank exists. This allows data to be analyzed on a community basis. Average total loan-to-deposit ratios are computed for communities as follows:

$$ATLDR = \frac{ATL}{ATD}$$

where,

ATL = total loans for all bank offices in a community, 1977-1980

ATD = total deposits for all bank offices in a community, 1977-1980

Independent Variables (Bank Related)

Bank Structure (BS). The study hypothesizes that bank structure has an impact on the amount of credit a bank allocates to local borrowers. To account for unit banking and branch banking, a dummy variable is utilized. For the unit banking state of Colorado, bank structure is assigned a value of zero and in Arizona, a branch banking state, bank structure is assigned a value of one.[3]

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3. Unit banking laws in Colorado allow banks to belong to holding companies. Distortions are minimized though because holding companies cannot transfer assets between member banks as easily as banks can transfer assets between branches under branch banking laws.

Bank Structure Interaction Terms. The inclusion of BS·PR and BS·SZ interaction terms was to test for the possibility that the loan-to-deposit ratios vary for communities with different growth rates within Arizona and among branch banks of different size. A negative coefficient for the bank structure variable in conjunction with positive coefficients for the bank structure - community growth rate interaction terms (BS·PR and $BS \cdot PR^2$) may indicate that loanable funds had been transferred within nonmetropolitan Arizona and not from the state's rural to urban counties. BS·SZ and $BS \cdot SZ^2$ were used to account for differences in management philosophies and practices identified with large and small banks. Further discussion of the interaction terms is provided in Appendix B.

Competition (CS). Competition was hypothesized to influence bank ALDRs. Therefore, a list of alternative credit sources was compiled for the communities studied. This information includes 1) a breakdown of commercial banks into those that are in one-bank towns and those that are in multi-bank towns, 2) the number of saving and loans and industrial banks present in each community, 3) the number of credit unions present in each community and 4) the number of loan companies present in

each community. As competition increases, i.e., as the number of available credit sources increases, the loan-to-deposit ratios were projected to rise. LDR increases would result from financial institutions increasing loans to attract or keep depositors, or a redistribution of deposits as new credit sources lure depositor funds from credit sources.

Management Behavior (STM, SBA, SZ). Time and savings deposits-to-total deposit ratios (STM) were computed for all banks.[4] Time and savings deposits are considered stable reserves from which banks can draw loanable funds. As a result, it is expected that a positive relationship exists between STMs and bank ALDRs. The time and savings deposits and total deposits of all a bank's offices, metropolitan and nonmetropolitan, were used to calculate the STM in Arizona. This was done because the bank evaluates and bases portfolio decisions on aggregated data and the amount of credit branch offices can then make available to local communities may be dependent on the STM of the bank as a whole and not

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4. Time and saving deposit and total deposit data for Colorado was provided by Federal Reserve Bank data tapes and Arizona State Banking Department reports provided this information for Arizona.

individual branch offices. This procedure was followed for Colorado but since it is composed of only unit banks there was no change in the STMs.

Small Business Administration loan volume for 1977-1980 (SBA) is included to assess the impact of government loan programs on bank lending behavior. A community with a large volume of SBA loans may be experiencing growth and need to import as much capital as possible to finance the building and expansion of businesses. SBA loans may be a convenient method for the banks to increase their loan volume yet minimize their risk exposure. Alternatively, a large volume of SBA loans may signify a faltering economy; one in which the bank hesitates to make a loan unless the loan is guaranteed.

Management behavior is also hypothesized to be influenced by bank size (SZ). The larger a bank is in relation to other banks within the state, the more aggressive it is thought to be. As deposits at a bank increase, that bank is better able to diversify its loan portfolio and increase loan volume with little additional exposure to default. Thus, the higher the volume of bank deposits, the greater the potential for increased bank profitability and the greater the capability of a bank to absorb incurred losses. The bank

size variable is the ratio of a bank's total deposits to the total deposits of the largest bank operating non-metropolitan offices in the state.

Independent Variables (Community Related)

Demographic data and the structure of employment in communities was used for ceteris paribus purposes.

Demographic (PR, EP, C, AM, RSR, PCY). Demographic data was used to account for market characteristics. Changes in community population (PR) may be indicative of potential economic growth or decline. Increases in population may be associated with an increase in deposits as well as an increase in the bank's opportunity to generate profitable loans. A community that is slow growing or experiencing a decline in population may be losing deposits as people leave the area and bank loans may become more risky if local industries or businesses are also relocating or declining.

It is hypothesized that the greater the percentage of elderly in a community, the lower the loan-to-deposit ratio. Relative to younger adults, the elderly have less demand for credit. Banks can utilize the fairly stable deposits of the elderly but in such places as retirement communities, the local pool of borrowers may be small. Therefore, a large elderly

population may decrease the number of profitable loans a bank can make in the local market and encourage the exodus of funds from a community. To isolate the impact of retirees on bank loan-to-deposit ratios, a variable for the percent of the community population over 65 years of age (EP) was included.

A dummy variable that identified communities as college towns (C) was included. College students would increase the deposits at local banks and have relatively low loan demands. Simultaneously, businesses would benefit from student spending and appear as attractive loan recipients to the banks. This would encourage a rise in the loan-to-deposit ratio of the banks. However, banks may not perceive student deposits as being a stable source of loan capital so that even if deposits increase, loans would not increase and the loan-to-deposit ratio would fall.

Proximity to a metropolitan area may affect the loan-to-deposit ratios of rural banking offices because residents from rural communities near metropolitan areas may deposit funds and/or acquire credit from urban markets. A dummy variable (AM) that assigned a value of one to towns adjacent to metropolitan areas and zero otherwise was utilized to test for the influence of

proximity. A town adjacent to a metropolitan area was defined as being within 30 miles of a city with a population exceeding 50,000.

Changes in the relative wealth of communities are hypothesized to influence loan-to-deposit ratios. The regressors tested are percentage changes in community retail sales (RSR) and percentage changes in community per capita income (PCY). Both variables are expected to have a positive relationship with loan-to-deposit ratios.

Employment Structure (MFG, MN, TR, SV, AG, UN, PNL, BP). The percentage of county employment in manufacturing (MFG), mining (MN), trade (TR), service (SV), and agricultural (AG) occupations is included to control for differences in industrial structure. Unemployment figures are also included as an indicator of the general economic health of a county. The number of people employed in the largest manufacturing and mining industries in a community (PNL) and the percentage of these people employed in branch plant operations are also included as independent variables. It is believed that where branch plant operations dominate, the demand for local business credit will be low and therefore,

bank office loan-to-deposit ratios will also be low.[5] In summary, Table 1 provides a list of the dependent and independent variables and their anticipated signs.

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5. A branch plant is defined as one where the home corporate offices are located in a major city and it is likely that the home office will acquire credit for it's branch plants in the national markets.

TABLE 1

Model Variables and Anticipated Signs

Dependent Variables		Anticipated Signs
ALDR	= average loan-to-deposit ratio by bank office 1977-1980	
LNALDR	= log of the average loan-to-deposit ratio by bank office, 1977-1980	
ATLDR	= average loan-to-deposit ratio by community, 1977-1980	
LNATLDR	= log of the average loan-to-deposit ratio by community, 1977-1980	
Independent Variables		
BS	= branch structure dummy (1= statewide branch banking; 0= unit banking)	?
CS	= credit sources in a community, includes OB, CU, SL, LC	+
OB	= number of other banks in a market area	+
CU	= number of credit unions in a community	+
SL	= number of saving and loans in a town	+
LC	= number of loan companies in a community	+
SBA	= amount of SBA loans granted in a community, 1977-1980	?
STM	= time and savings-to-total deposit ratios for each bank, 1980	+
CTM	= time and savings-to-total deposit ratios for each community, 1980	+
SZ	= bank size in terms of deposits	+
PR	= population ratio by community, 1970-80	+
EP	= percentage of population over 65 years of age by community, 1980	-
RSR	= retail sales ratio by community, 1972-1977	+
PCY	= percentage change in estimated per capita income by community, 1969-1977	+
AG	= percentage employed in agriculture by county, 150 days or more, 1978	?
MN	= percentage employed in mining by county, 1980	?
SV	= percentage employed in service occupations by county, 1980	?
MFG	= percentage employed in manufacturing by county, 1980	?
TR	= percentage employed in wholesale and retail trade by county, 1980	?
UN	= percentage unemployed by county, 1980	?
AM	= community adjacent to metropolitan area dummy	-
C	= college community dummy	?
AFS	= average farm size in acres by county, 1978	+
BP	= percentage of manufacturing and mining work force employed by branch plants, by community	-
PNL	= percentage of manufacturing and mining work force employed by the largest industry in a town	-
BS·PR	= cross product term; accounts for interaction between bank structure and population ratio	
BS·SZ	= cross product term; accounts for interaction between bank structure and bank size	

CHAPTER 4

SUMMARY OF THE RESULTS

Arizona and Colorado were chosen as the basis for this study because the two states share many similar characteristics. The total population in Arizona and Colorado are essentially equivalent, with approximately 80% of the people residing in urban regions and 20% in rural areas. Both states are experiencing rapid growth in population. Between 1970 and 1980, the population in rural and urban areas increased for both states. Table 2 dicotomizes the state growth rates in both metropolitan and nonmetropolitan categories. The data indicates that in Arizona and Colorado there were very little percentage change differences between nonmetropolitan and metropolitan growth rates.

The wealth of natural resources enjoyed by Colorado and Arizona are primary factors in their economies. The climate and beauty of Colorado and Arizona promote a tourist industry that generates billions of dollars in revenues per year. The mining of copper in Arizona and petroleum and coal in Colorado are major employment and revenue producing industries for the

TABLE 2

Metropolitan and Nonmetropolitan Growth Rates, Arizona and Colorado, 1970-1980

	Metropolitan Population	Nonmetropolitan Population
Arizona		
1970	1322895	452504
1980	2040495	677720
% Change	54.2%	49.7%
Colorado		
1970	1673976	535620
1980	2176907	711927
% Change	30.0%	32.9%

two states. In the agricultural sector, the production of primary crops such as cotton in Arizona and wheat and corn in Colorado, rely on irrigation.

Despite having population, manufacturing, agricultural, mining and tourism bases that impact the economies of the states in similar ways, the percentage of loans in relation to deposits allocated by Colorado unit banks is less than that granted by Arizona branch banks. This discrepancy indicates that the diverse banking structures of the two states may have a significant influence on the availability of credit in communities.

Initial Findings

Bank Concentration at the State Level

The percentage of total deposits in a market controlled by a bank serves as a proxy for the market power of that bank. Bank concentration is a function of the number and relative size of organizations in a market area. Table 3 provides comparative data for Arizona and Colorado banks by size of bank and deposit strength. The three largest banking organizations in Arizona control nearly 85% of all deposits. Therefore, at the state level banking in Arizona is highly concentrated. By

TABLE 3

Size Distribution of Banks and Bank Deposits;
Arizona, Colorado and the United States;
December 31, 1980

	Size of Bank in Millions of Dollars of Assets		
	less 50	50 to 1000	over 1000
Arizona			
Banks	.7714	.1428	.0857
Deposits	.0183	.1330	.8486
Colorado			
Banks	.8688	.1267	.0045
Deposits	.3407	.4611	.1982
United States			
Banks	.7499	.2369	.0132
Deposits	.1324	.2884	.5793

Source: FDIC Annual Report 1980

comparison, concentration in Colorado is relatively low. Banks with over one billion dollars of assets in Colorado have attracted approximately only 20% of total Colorado commercial deposits. Table 3 also indicates that Colorado banks in the smallest category, i.e., with assets less than fifty million dollars, are the repository for a greater percentage of deposits than similar size banking organizations in Arizona.

Availability of Bank Offices

A measure of the convenience offered by a bank is the number of people each office serves. Data was compiled to determine if the Arizona branch banking system or the Colorado unit banking system offered any advantage in terms of the average number of people served per office. The banking structure associated with the lower per office mean population would seem to benefit customers. A lower per office mean would be indicative of a greater number of bank offices in a region. This is an important issue for people in rural areas. For rural residents, there may be few options in choosing a place to conduct banking business and the distance to reach the bank office may be great. Too few bank offices in rural areas impose hardships on many residents who need services and the lack of competition may allow a

bank to exercise monopoly power. In Table 4, a comparison of the number of banks in nonmetropolitan areas and the mean nonmetropolitan population served by a bank office in Arizona and Colorado reveal no differences. The unit banking system of Colorado and the statewide branching system of Arizona perform equally well. Apparently, other factors besides branching structure, such as profitability, influenced decisions to establish banking offices in nonmetropolitan areas.

Loan-to-Deposit Ratios

Loan-to-deposit ratios (LDRs) are an indicator of a bank's ability and willingness to serve the credit needs of a community. As branching restrictions are removed and concentration at the state level increases, bank lending policies may be affected. If branching affects the availability of credit to rural areas, there should be significant differences between the lending behavior of Arizona and Colorado banks.

LDRs for Arizona and Colorado are presented in Table 5. The loan and deposit data for Arizona pertains only to the three largest banks, i.e., those institutions that control 85% of bank assets in the state. In Arizona, LDRs of metropolitan banks are consistently higher than the LDRs of Arizona nonmetropolitan banks. Colorado LDRs

TABLE 4

Mean Nonmetropolitan Population Served by Bank Office; Arizona and Colorado, 1980

	State	
	Arizona	Colorado
1980 Non SMSA Population	677720	711927
Non SMSA Bank Offices	146[a]	157
Non SMSA Population Per Office	4642	4535

a 122 of the 146 bank offices in Non SMSA Arizona were branches of the 3 largest banks.

TABLE 5

Metropolitan, Nonmetropolitan, and State Loan-to-Deposit Ratios; Arizona[a] and Colorado; 1977-1980

State and Year	Nonmetropolitan	Metropolitan	State
1980			
Arizona	.692	.726	.720
Colorado	.673	.647	.654
1979			
Arizona	.699	.722	.718
Colorado	.702	.665	.673
1978			
Arizona	.648	.726	.712
Colorado	.713	.690	.695
1977			
Arizona	.591	.689	.671
Colorado	.685	.679	.680

a Loan and deposit data for Arizona pertain only to the three largest banks.

exhibited the opposite trend, with nonmetropolitan banks having higher LDRs than metropolitan banks over the 1977-1980 period. This information lends credence to the hypothesis that rural to urban fund transfers are exacerbated by statewide branching. However, even with rural to urban transfers of loanable funds, Arizona nonmetropolitan branch banks have similar LDRs with Colorado nonmetropolitan unit banks. The LDRs of Colorado nonmetropolitan banks were higher in 1977 and 1978, equal in 1979 and slightly less in 1980 than Arizona nonmetropolitan bank LDRs. This may occur because of the more aggressive nature of branch banks. On the state level, Arizona banks maintained higher LDRs in all years except 1977. This seems to indicate statewide branching results in the extension of more credit overall than does unit banking.

Population Change and LDRs of Nonmetropolitan Regions

Population growth rates demonstrate the presence or dearth of dynamic forces operating within a community. When a community is prospering, there is growth in the employment sector, growth in overall population and growth in the demand for bank credit. By examining the data in Table 6, it can be seen that Arizona banks in areas losing population have the most conservative

TABLE 6

Loan to Deposit Ratios of Nonmetropolitan Communities by Growth Rate; Arizona[a] and Colorado; 1977-1980

State and Year	Percentage Change in Nonmetropolitan Communities Population, 1970-1980			
	Negative	0 - 24.9%	25 - 49.9%	50% +
1980				
Arizona	.475	.663	.774	.706
Colorado	.643	.681	.701	.672
1979				
Arizona	.520	.698	.812	.670
Colorado	.696	.723	.688	.699
1978				
Arizona	.465	.640	.794	.577
Colorado	.677	.714	.731	.709
1977				
Arizona	.430	.616	.726	.469
Colorado	.632	.718	.695	.646

a Loan to deposit ratios for Arizona pertain only to the three largest banks.

lending behavior. Apparently, depositor's funds are transferred to regions where more profitable loans are possible or utilized in investment strategies that require less risk. Colorado banks had significantly higher LDRs than Arizona banks in the negative growth category. In communities experiencing modest growth (0 - 24.9%), Colorado unit banks also had slightly higher LDRs than Arizona banks. In more rapidly growing regions (25 - 49.9%) however, Arizona banks committed a higher proportion of deposits to loans. The fastest growing communities (50% +) in Colorado had LDRs that remained fairly stable over the study period. In the same growth category, Arizona LDRs increased markedly between 1977 and 1980. In 1979 and 1980 though, the LDRs for rapidly growing nonmetropolitan areas in Arizona and Colorado had no significant differences.

Arizona LDRs increased as the population growth rate increased, except in the most rapidly growing regions. The most rapidly growing areas in Arizona though are often retirement communities, where loan demand is traditionally weak and deposit stability high.

LDRs in Single and Multiple Bank Markets

Bank concentration at the local level is defined as the number of banks operating within a ten-mile

radius of the town. When a bank is the only source of credit in this immediate area, it could be expected to behave differently than in competitive situations. Table 7 subdivides single and multiple bank market LDRs by town growth rate. Differences in one-bank town and multiple bank town lending behavior in nonmetropolitan Arizona and Colorado may be attributable to differences in banking structure.

Arizona bank lending behavior appears to be tied to the existence of competition and the rate of population growth in the community. Arizona banks in similar size town growth categories have higher LDRs where multiple banks exist rather than where only one bank is located. The LDRs are highest for Arizona one-bank towns and multiple bank towns when the town growth rate is 50% +. The data in Table 7 suggests Arizona branch banking may encourage a siphoning of funds from negative or slow growth communities to those that are prospering. By contrast, the presence or absence of competition in banking, i.e., one-bank towns versus multiple bank towns, seems to have little effect on the lending behavior of Colorado unit banks. Apparently also, town growth rates are not an overpowering influence in the decision of Colorado nonmetropolitan banks to grant loans. The LDRs

TABLE 7

Loan to Deposit Ratio of Single Bank and Multiple Bank Markets, Nonmetropolitan Arizona and Colorado, 1980

Town Growth Rate	Loan to Deposit Ratios			
	Arizona		Colorado	
	One Bank Towns[a]	Multiple Bank Towns	One Bank Towns	Multiple Bank Towns
No Growth	.498 (8)[b]	.591 (3)	.653 (14)	.603 (15)
0 - 49.9%	.409 (5)	.737 (12)	.649 (22)	.666 (66)
50% +	.656 (6)	.748 (9)	.646 (10)	.644 (29)

a One bank towns were defined as communities for which only one bank was operating within a ten-mile radius of the town.

b Number of communities in the growth rate--bank number cell.

of Colorado unit banks suggest adherence to management's standard policies when allocating deposited funds to loans rather than a more direct response to competition and growth.

Funds Outflow

The nation's credit markets tightened and interest rates rose sharply from 1978 to 1980. Until 1978, savings in communities were relatively inert. In 1978, a new six-month certificate of deposit with a return tied to Treasury-bill rates was authorized. The rate on these certificates quickly soared due to high inflation rates and the Federal Reserve's attempt to curb inflation through tight credit. Local savers, trying to defend the value of their savings against inflation sent investment money out of local banks to money-market funds and to certificates of deposits. Banks may have tried to preserve profitability and liquidity by investing in money-market instruments rather than in loans to their local communities. Tight credit may have caused branch banking institutions to reduce credit allocations to rural borrowers in order to service large urban customers. Unit banks may also have reduced the amount of loans granted to rural customers in favor of more profitable, less risky government bond purchases. To

determine if branch banks or unit banks invested more funds outside the community during this tight credit period, outflow elasticities are calculated. Outflow elasticities (OE) indicate the percentage change in non-locally committed funds associated with a 1% change in deposits. For rural bank offices, outflow elasticities are computed using the formula:

$$OE_{t,t-1} = \frac{\frac{O_t - O_{t-1}}{O_{t-1}}}{\frac{D_t - D_{t-1}}{D_{t-1}}}$$

where,

O_t = $deposits_t$ - $loans_t$; i.e., the flow of funds to non-local areas for time period t

D_t = commercial bank deposits for time period t

t, t-1 = 1980 and 1978 respectively

A decrease in LDRs for the 1978-1980 tight credit period along with an "outflow" elasticity greater than one, indicates the percentage increase in the outflow of funds was greater than the percentage increase in deposits. Between 1978 and 1980, LDRs in Colorado declined in all population growth categories (Table 6).

Table 8 shows Colorado nonmetropolitan communities, regardless of growth rate, also had "outflow" elasticities greater than one; this indicates that nonmetropolitan Colorado communities experienced increased fund outflows. Only Arizona rural communities in the 25 - 49.9% growth rate category experienced a similar phenomenon. The percentage increase in fund outflow was less than the percentage increase in deposits for nonmetropolitan Arizona towns with growth rates less than 25%; while in rapidly growing Arizona communities, i.e., 50% +, an increase in deposits was accompanied by a decrease in the outflow of funds.

As evidenced by "outflow" elasticities, Arizona branch banking may have been beneficial to nonmetropolitan towns. Based on the "outflow" elasticities criteria, Colorado unit banks pursued policies that drained funds from small communities during a time when credit was difficult to obtain.

Regression Results

Arizona and Colorado Banks

Presented in Table 9 are ordinary least squares (OLS) estimates of each variable for the combined Arizona and Colorado bank data. These analyses indicate bank

TABLE 8

Outflow Elasticities (E) of Nonmetropolitan Communities by Growth Rate; Arizona and Colorado; 1978-1980

Non-SMSA Communities' Growth Rates	State	
	Arizona	Colorado
Negative	.871	1.527
0 - 24.9%	.652	1.574
25 - 49.9%	1.411	1.926
50% +	- .411	1.498
Non-SMSA Total	.359	1.652

TABLE 9

Regression Results for Arizona and Colorado Banks; 1977-1980

Equation Variables	Equation 1 (ALDR) B value (t statistic)	Equation 1a (LNALDR) B value (t statistic)
BS	-.3084	-.4422
	(-3.059)	(-2.667)
CS	.1953E-01	.3747E-01
	(2.737)	(3.192)
SBA	.1241E-04	.6216E-05
	(.659)	(.201)
STM	.5012	.5289
	(.443)	(.284)
EP	-.6619E-02	-.1024E-01
	(-3.467)	(-3.262)
RSR	.5927E-01	.1284
	(1.525)	(2.010)
PCY	.2157E-02	.9441E-02
	(.390)	(1.037)
AG	.1702E-02	.7659E-03
	(.390)	(.107)
MN	-.3526E-02	-.4235E-02
	(-1.510)	(-1.102)
MFG	-.2582E-02	-.3329E-02
	(- .860)	(- .674)
TR	-.3417E-02	-.4617E-02
	(-1.304)	(-1.072)
UN	-.1974E-01	-.3658E-01
	(-1.127)	(-1.270)
BP	-.2733E-03	-.1667E-03
	(- .549)	(- .204)
BS·PR	.1458	.1763
	(3.359)	(2.470)
BS·SZ	-.4620	-1.0308
	(-1.895)	(-2.571)
SV	-.3267E-02	-.4632E-02
	(-1.253)	(-1.081)
STM2	-.1852	-.7797E-01
	(- .193)	(- .494E-01)
BS·PR2	-.1564E-01	-.1905E-01
	(-3.483)	(-2.532)
BS·SZ2	.6593	1.3129
	(3.198)	(3.873)
RSR2	-.5633E-02	-.1179E-01
	(-1.364)	(-1.736)
SBA2	-.2308E-08	-.3420E-08
	(-1.929)	(-1.738)
UN2	.1874E-02	.2960E-02
	(1.948)	(1.870)
PCY2	-.8888E-05	-.4071E-04
	(- .318)	(- .887)
Constant	.5684	-.9306
	(1.148)	(-1.142)
F Significance	4.9899	5.607
Adjusted R^2	.2791	.3090

structure, bank size and the existence of alternative credit sources significantly influence the amount of credit a bank extends to rural customers.

The signs of the coefficients were as hypothesized in Chapter 3. RSR was significant and positive while PCY and AG were positive but not significant. SBA loan coefficients weakly support the hypothesis that increasing government guaranteed credit increases the LDRs of rural banks. EP, MN, TR, SV and UN have a negative and significant relationship to LDRs. Banks are wary of lending in communities where a dominant industry is extremely vulnerable to a fluctuating market, e.g. mining. However, the mining industry may be borrowing from non-local sources. Banks may be sensitive to the financial needs of the members of a community but understandably reluctant to extend credit when there is the prospect or instance of a local industry laying people off. Increases in unemployment are accompanied by decreases in a bank's LDR. This results from the unemployed drawing down a bank's deposits and the bank instituting tighter lending policies in the face of worsening economic conditions. As expected, the greater the percentage of elderly in a community, the lower the LDRs due to a lack of local loan demand and stable

deposit resources. The interaction terms BS·SZ, BS·SZ^2, BS·PR, BS·PR^2 were significant. The significant coefficients on the interaction terms indicates that whether branch banks increased or decreased LDRs relative to unit banks depended upon bank size and community growth rates. Evidence indicating a greater flow of funds among regions in branching states is provided by the coefficients on the BS·PR and BS·PR^2 terms. The squared terms RSR2, SBA2 and UN2 were significant and had signs that were consistent with earlier hypotheses.

Arizona and Colorado Communities

An alternative specification examined bank data in the community context. This analysis of Arizona and Colorado communities (Table 10) again resulted in bank structure, the number of credit sources present in a community and bank size being significant in explaining bank lending behavior. The presence of alternative sources of credit seems to spur commercial banks to offer a greater proportion of loans in relation to deposits than in communities where no competition exists. RSR was positive and significant and retail sales increases seem to indicate a prospering community, one where a bank would be willing to extend credit to local customers. The cross-product term, BS·PR, was also

TABLE 10

Regression Results for Arizona and Colorado Communities; 1977-1980

Equation Variables	Equation 2 (ATLDR) B value (t statistic)	Equation 2a (LNATLDR) B value (t statistic)
CS	.2236E-01 (2.599)	.4830E-01 (2.725)
UN2	.2713E-02 (3.372)	.4331E-02 (2.585)
MN	-.2234E-02 (-1.425)	
RSR2	-.3605E-03 (-1.235)	-.9872E-03 (-1.640)
BS•PR2	-.1780E-01 (-3.777)	-.2223E-01 (-2.275)
EP	-.5433E-02 (-2.746)	-.9312E-02 (-2.377)
TR	-.1917E-02 (- .965)	
SV	-.2871E-02 (-1.730)	-.2228E-02 (- .952)
BS	-.5223 (-5.018)	-.8276 (-3.876)
UN	-.3137E-01 (-2.057)	-.5842E-01 (1.842)
RSR	.1852E-01 (1.225)	.5240E-01 (1.690)
BS•PR	.1749 (3.677)	.2225 (2.250)
SZ•BS	.3683 (4.418)	.6440 (3.744)
CS2	-.1485E-02 (-2.343)	-.2989E-02 (-2.281)
Constant	.8972 (5.771)	-.3150 (-1.893)
F Significance	5.3624	4.4432
Adjusted R^2	.2714	.2012

positive and significant and this result was in agreement with the hypothesis that the interrelationship between population growth and branch structure is a factor in explaining bank LDRs. EP, MN, TR, SV and UN were again negative and significant.

Regression Results for Arizona Banks

The regression results from utilizing Arizona data only are provided in Table 11. In this case, branch structure (BS) remains a constant, i.e., one, throughout the analysis. Alternative credit sources (CS) is again positive and significant and the percentage of elderly in a community (EP) is again negative and significant. SBA, STM and PR enter the equation as positive, significant variables. The performance of the SBA variable for Arizona data indicates that increases in Small Business Administration government guaranteed loans has a positive effect on a bank's LDR. In Arizona, the greater the ratio of saving and time deposits - to - total deposits, the more likely it was that a bank would have a high LDR. This finding was expected since time and saving deposits are relatively stable over time and offer a good base from which a bank can grant loans. The population ratio (PR) is one indicator of community growth; some areas of Arizona are

TABLE 11

Regression Results for Arizona

Banks; 1977-1980

Equation Variables	Equation 3 (ALDR) B value (t statistic)	Equation 3a (LNALDR) B value (t statistic)
BS	constant	constant
CS		.6191E-01
		(1.025)
SBA		.3511E-03
		(1.555)
STM	2.7054	7.1859
	(2.021)	(4.455)
PR	.1031	
	(1.409)	
EP	-.6801E-02	-.1601E-01
	(-1.695)	(-2.432)
RSR	.3211	.8867E-01
	(.628)	(.114)
PCY	-.2274E-01	.2352E-01
	(- .981)	(.660)
AG		-.3231E-01
		(-1.676)
MN		-.8223E-03
		(- .111)
MFG		-.2048E-01
		(- .898)
TR		-.2031E-01
		(-2.001)
UN	.2689E-01	.1261
	(.389)	(1.026)
BS·PR		.6088E-01
		(.551)
BS·SZ	-.3270	-1.3482
	(- .902)	(-2.559)
BS·PR2	-.1127E-01	- .4497E-02
	(-1.526)	(- .404)
BS·SZ2	.5747	1.2500
	(1.879)	(2.875)
RSR2	-.4434E-01	.3376E-01
	(- .320)	(.159)
SBA2	.9061E-08	-.8626E-07
	(.858)	(-1.816)
UN2	-.2272E-03	-.5148E-02
	(- .694E-01	(- .908)
PCY2	.1245E-03	-.9770E-04
	(.962)	(- .488)
CS2	.3509E-02	.8310E-02
	(1.981)	(.336)
Constant	.7845	-3.8727
	(.766)	(-1.960)
F Significance	4.307	5.289
Adjusted R^2	.333	.512

growing rapidly while other towns are slowly dying. In areas where population is increasing, it is more likely the LDR will be high than in a community where the population growth rate is in decline.

Regression Results for Colorado Banks

In analyzing data for Colorado banks (Table 12), the branch structure variable (BS) was a constant of zero. The alternative credit source variable (CS) and the saving and time deposit - to - total deposit variable were positive significant. The bank size variable (SZ) also entered the equation as positive and significant, indicating that large banks are generally more aggressive in their lending behavior. The elderly population variable (EP) agreed with previous results, being both negative and significant.

Regression Results for Arizona Communities

Analyses of collected data in the community context indicate that demographic and economic influences are factors in determining a bank's LDR. For Arizona communities (Table 13), branch structure is again a constant. The elderly population variable (EP) is negative and significant, as is the retail sales variable (RSR) and the trade variable (TR). Bank size (SZ) is

TABLE 12

Regression Results for Colorado Banks; 1977-1980

Equation Variables	Equation 4 (ALDR) B value (t statistic)	Equation 4a (LNALDR) B value (t statistic)
BS	constant	constant
CS	.6377E-02 (1.054)	
SBA	-.4562E-05 (- .648)	
STM	.1863 (2.092)	.1837 (1.268)
SZ	.1304 (2.007)	
EP	-.3374E-02 (-2.639)	-.2091E-02 (- .893)
RSR		.8908E-01 (2.084)
PCY	.5352E-02 (1.140)	.8330E-02 (1.269)
UN		-.2869E-01 (- .992)
RSR2		-.7803E-02 (-1.757)
UN2		.2605E-02 (.835)
PCY2		-.3607E-04 (-1.119)
Constant	.5079 (6.797)	-.9471 (-2.785)
F Significance	3.981	1.370
Adjusted R^2	.115	.022

TABLE 13

Regression Results for Arizona Communities; 1977-1980

Equation Variables	Equation 5 (ATLDR) B value (t statistic)	Equation 5a (LNATLDR) B value (t statistic)
BS	constant	constant
CS	.3485E-01 (.868)	.1264 (1.824)
SZ	.5781 (4.511)	.9916 (4.482)
EP	-.8906E-02 (-1.955)	-.1400E-01 (-1.780)
RSR	-.7010 (-1.371)	-.6894 (- .781)
MN	-.1456E-02 (- .369)	-.6539 (- .960E-01)
TR	-.1460E-01 (-2.219)	-.2344E-01 (-2.065)
UN	.4805E-01 (.707)	.6480E-02 (.552E-01)
BS·PR	.1057 (1.497)	.6090E-01 (.500)
SV	-.4649E-05 (- .131E-02	.7029E-03 (.115)
BS·PR2	-.1099E-01 (-1.604)	-.5767E-02 (- .488)
RSR2	.2485 (1.764)	.2987 (1.228)
UN2	-.1130E-02 (- .373)	.9223E-03 (.176)
CS2	.3071E-02 (.613)	-.1077E-02 (- .125)
Constant	.4348 (.649)	-.9871 (- .854)
F Significance	5.3848	5.2777
Adjusted R^2	.5230	.5168

highly significant and positive indicating that those banks with large assets are more capable or willing to extend credit in rural areas.

Regression Results for Colorado Communities

In the results for Colorado communities (Table 14), bank size (SZ) and the saving and time deposit - to - total deposit ratio for the community (CTM) were positive and significant. Apparently in Colorado, the larger banks more readily granted loans than smaller institutions. For communities in which the banks had high ratios of saving and time - to - total deposits, the regression results indicated the LDR was likely to be higher than in communities which lacked a high CTM.

TABLE 14

Regression Results for Colorado

Communities; 1977-1980

Equation Variables	Equation 6 (ATLDR) B value (t statistic)	Equation 6a (LNATLDR) B value (t statistic)
BS	constant	constant
CS	.5039E-02 (.557)	.6440E-02 (.284)
CTM	.1971 (1.761)	
SZ	.2945 (1.208)	.2912 (.538)
EP	-.6154E-02 (-3.294)	-.1487E-01 (-3.190)
RSR	.6982E-02 (.645)	.1132E-02 (.193)
MN	-.1785E-02 (-1.892)	-.4255E-02 (-1.741)
UN	-.2895E-01 (-1.451)	-.7307E-01 (-1.406)
SV	-.3087E-02 (-2.517)	-.7315E-02 (-2.330)
RSR2	-.1370E-03 (- .653)	
UN2	.2841E-02 (1.365)	.6740E-02 (1.254)
CS2	-.6176E-03 (-1.200)	
Constant	.7577 (6.941)	.1626 (.795)
F Significance	2.1835	1.8180
Adjusted R^2	.1050	.0557

CHAPTER 5

CONCLUSIONS AND IMPLICATIONS

The comparison of Arizona and Colorado banks indicates that there existed substantial variation in the amount of credit distributed to nonmetropolitan regions across the two states. There was variation between similar nonmetropolitan areas that was attriutable, at least in part, to the differences in bank structure. In addition, the demographic and economic characteristics of Arizona and Colorado rural communities affected the loan volume of local banks. In short, the direction and magnitude of credit flows between rural and urban areas was affected by bank structure and community characteristics.

An assessment of banking performances in Arizona and Colorado found Arizona branch banks, in the aggregate, to have had higher LDRs than Colorado unit banks. Within Arizona, the LDR of metropolitan area bank offices was greater than the LDR of nonSMSA bank offices. This finding indicates rural - urban fund transfers may have occurred. Still, the LDR of nonSMSA Arizona bank offices was approximately equal to the LDR of nonSMSA Colorado

unit banks. The results of the regression analysis indicate, ceteris paribus, that Arizona communities which were rapidly growing or served by branch offices of the larger banking organizations had LDRs greater than those reported for similar nonmetropolitan areas in Colorado. The slower growing or negative growth nonmetropolitan communities in Arizona or those served by smaller banks had less availability of credit than would have existed under unit banking. Thus, credit flows in Arizona are in the direction of SMSAs and rapidly growing nonSMSAs and away from the slower growing nonSMSA communities.

Goals and Conflicts

The results of this study illustrate the tremendous potential for conflict among residents of a state over bank structure. Proponents of the Arizona branching system will point out that branch banking confers the greatest net benefits, i.e., is the most efficient. Branch banking is not wasteful of capital but uses it to generate the largest possible monetary return. Branch banks are able to transfer funds to areas with the greatest demand, usually those areas that are growing rapidly, and therefore increase the efficiency of fund use. However, these fund flows may not be

equitable because development could be retarded in the slower growing regions. That is, the liberalization of branching restrictions is correlated with a decrease in loans for those rural communities that have the greatest need for capital investments.

Who Will Be Banker to Rural Communities?

The practice by many banks of refusing to lend in rural areas thought to be "too risky" continues to exist. Such disinvestment may cause the abandonment of many businesses and houses and result in the further deterioration of rural communities. Thus, a vicious cycle may develop as banks cite deterioration as justification for not lending in rural areas.

As a result of community pressure, the Community Reinvestment Act (CRA) was passed by Congress in 1979. The CRA demands that all banks and savings associations must meet the credit needs of all communities it serves, including low and moderate income communities. The federal agencies which regulate the banks were required to consider the bank's CRA lending record before approving any applications for new branches or mergers. Recent changes in the nature of banking and banking laws and regulations (i.e., the liberalization of branch banking regulations) threaten the ability of rural

community groups to hold the banks accountable to community credit needs. Often, the result of increased branch banking is that lending decisions which have in the past been made in the rural areas are now made in central cities. Such remoteness in decision-making may lead to unresponsiveness to community needs.

The opportunity to protest a bank's application for a new branch under the CRA has been one of the most effective means for community groups to affect the lending policies of banks. If rural communities are to effectively meet the challenges of the new era of banking, community groups must more aggressively monitor the lending and social activities of area banks and hold them accountable to community needs. Rural areas suffer from a serious shortage of venture capital, i.e., money necessary to allow a company to grow through its early stages, from developing a concept to bringing a product to market. The banks must reaffirm and strengthen their commitment to rural communities. Innovative strategies for providing credit to people living and investing in rural areas must be developed by the banks and through bank and community partnerships. The CRA needs to be supported by law makers and effectively utilized by rural community groups and agencies. State legislatures must

be aware of their responsibilities to rural constituents and seek to balance total statewide economic growth with equity considerations. Without cooperation between banks and community groups, the banking revolution may bypass nonmetropolitan regions.

APPENDIX A

COMMUNITY AND BANK RELATED DATA SOURCES

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APPENDIX B

REGRESSION MODEL FORMULATION

The linear function of the regression model[1] can be formulated as:

$$ALDR = a + bPR + cBS$$

where,

ALDR = average loan-to-deposit ratio, 1977-1980

PR = population ratio by community, 1977-1980

BS = 1 for statewide branching

BS = 0 for unit banking

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1. A linear model may not be the "best" method of expressing the inexact relationship between the dependent variables and the independent variables. The appropriate mathematical model may be nonlinear, where the estimating equation is:

$$ALDR = \alpha_1 + \alpha_2 PR^2 + \alpha_3 BS + \alpha_4 Z$$

This model is nonlinear in the variable PR but it is linear in the parameters α_1, α_2, α_3, α_4; so, there is no problem using ordinary least squares analysis. The problem of complete multicollinearity is avoided because although PR^2 is the square of Z when BS = 1, they are not linearly dependent; PR^2 and Z lie on a curve, not a line.

An alternative method of modeling the dependent and independent variable relationship is a semilogarithmic equation of the form:

$$ALDR = \log\alpha_1 + \alpha_2 \log PR + \alpha_3 \log BS$$

Another method of estimation tested for nonlinear functions is a double-logarithmic where:

$$\log ALDR = \log\alpha_1 + \alpha_2 \log PR + \alpha_3 \log BS$$

This is equivalent to the two separate equations:

ALDR = a + bPR + c for branch banking

ALDR = a + bPR for unit banking

The preceding two equations assume the two functions have the same slope but different intercepts (Figure 1)[2]. Based on preliminary data however, it is believed not only the intercept but also the slope of the ALDR functions will be different in branch banking and unit banking states. Therefore, an equation that considers change in slope as well as intercept should be fit, yielding:

$$ALDR = \alpha_1 + \alpha_2 PR + \alpha_3 BS + \alpha_4 Z$$

where,

ZZ = BS·PR and

ZZ = PR for branch banking and

ZZ = 0 for unit banking

2.

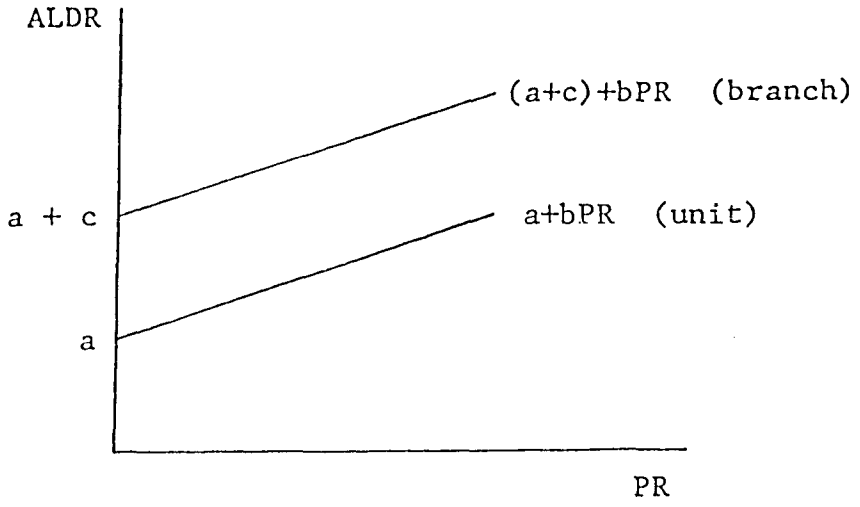

Figure 1

This function represents the equations illustrated in Figure 2:[3]

$$ALDR = \alpha_1 + \alpha_2 PR \text{ for unit banking, where the}$$

slope = α_2 and

$$ALDR = \alpha_1 + \alpha_2 PR + \alpha_3 + \alpha_4 PR$$

$$= (\alpha_1 + \alpha_3) + (\alpha_2 + \alpha_4)PR \text{ for branch banking,}$$

where the slope = $(\alpha_2 + \alpha_4)$ and $\alpha_3 < 0$ and $\alpha_4 > 0$

and $\frac{\partial ALDR}{\partial PR} = \alpha_2 + \alpha_4 BS$.

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3. ALDR

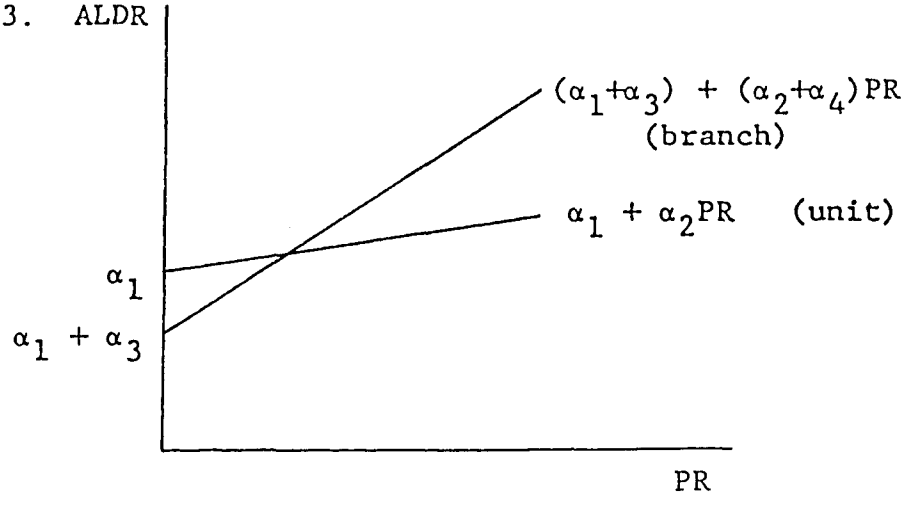

Figure 2

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